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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
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| **ART UNIT** | **PAPER NUMBER** |
| 2853 | 10 |

**DATE MAILED:** 10/12/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

| Office Action Summary | Application N . | Applicant(s) | |
|---|---|---|---|
| | 09/089,698 | SPITZ ET AL. | |
| | Examiner | Art Unit | |
| | Michael S. Brooke | 2853 | |

*-- Th MAILING DATE of this communication app ars on the cover sheet with th correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

**Status**

1)☒ Responsive to communication(s) filed on *20 September 2000* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-22 and 25-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22 and 25-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a)☐ All b)☐ Some * c)☐ None of the CERTIFIED copies of the priority documents have been:

1.☐ received.

2.☐ received in Application No. (Series Code / Serial Number) _____ .

3.☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

**Attachment(s)**

15) ☐ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-5 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964) and Hara et al. (4,296,421).

Braun et al. teaches (fig. 3A) an ink jet cartridge comprising a fluid block (50) which has a recess configured to receive a chip (60). Each of the recesses has ink supply passages (53, 54) formed therein. As can be seen in the figures, the block has a top surface and side walls attaches to the top surface. Also, as can be seen in Fig. 3A, an inlet tube is located on an opposing side of the substrate holder. This inlet tube is a chamber. Braun is silent as to the material with which the fluid block is made. While Braun does not teach the substrate holder being formed integrally with ink reservoir (3), it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the ink reservoir integrally with the substrate holder, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together requires only routine skill in the art (Howard v. Detroit Stove Works, 150 U.S. 164 (1893)).

Braun teaches the claimed invention with the exception of the side walls having fins, a coating of silicon dioxide, and the silicon dioxide having a thickness of between 0.1 to 2.5 microns.

It is well known in the ink jet art to use a layer of silicon dioxide ink an ink jet print head for the purpose of providing a protective layer. Furthermore, no criticality has been disclosed for the claimed thickness range. Therefore, it would have been obvious to one of ordinary skill in the art to provide a silicon dioxide layer having a thickness of between 0.1 to 2.5 microns for the purpose of providing a protective layer.

Fukuda et al. discloses an ink jet print head comprising a heat sink (1) made of aluminum for the purpose of cooling a heat generating substrate (10) (col. 6, lines 10-18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the fluid block taught in Braun from aluminum for the purpose of dissipating heat as taught by Fukuda et al.

Hara et al. discloses an ink jet print head containing a heating resistor (142) mounted on a substrate. A heat discharging fin (148) is located on a side of the print head for the purpose of convectively removing heat from the print head which was generated by the heating resistor (col. 35, lines 39-57). This would suggest to one of ordinary skill in the art that a heat discharge fin could be attached to the fluid block of Braun, as modified, for the purpose of improving heat discharge efficiency as taught by Hara et al.

3. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964) and Hara et al. (4,296,421), as applied to claims 1-5 and 10-12 above, and further in view of Wenzel et al. (5,426,458).

Braun, as modified, teaches the claimed invention with the exception of a polyxylylene coating having a thickness of about 0.1 to 10 microns.

Wenzel et al. discloses an ink jet print head having a coating of polyxylylene with a thickness of between 0.5 and 5 microns for the purpose of forming a corrosion resistant layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in Braun, as modified, a polyxylylene layer having a thickness of between 0.1 to 10 microns for the purpose of providing corrosion resistance.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964) and Hara et al. (4,296,421), as applied to claims 1-5 and 10-12 above, and further in view of Drake et al. (5,079,189).

Braun, as modified, discloses the claimed invention with the exception of the substrate holder comprising a material containing carbon fibers or graphite.

Drake et al. discloses a semi-conductor substrate having a heat sink (12.1) made of graphite for the purpose of cooling the substrate (col., 5, lines 16-18).

Therefore, it have been obvious to one having ordinary skill in the art at the time the invention was made to have provided in Braun, as modified, a substrate holder comprising graphite for the purpose of cooling the substrate.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964) and Hara et al. (4,296,421), as applied to claims 1-5 and 10-12 above, and further in view of Cook (5,834,689).

Braun, as modified, discloses the claimed invention with the exception of the substrate holder comprising a metal-ceramic composite.

Cook discloses a heat sink comprising a composite of a metal matrix and a ceramic for the purpose of improving the thermal conductivity of the heat sink so as to reduce its size.

It would have been recognized in the art of Braun that reducing the size of a heat sink would be desirable so as to reduce the overall size of the print head. Therefore, it have been obvious to one having ordinary skill in the art at the time the invention was made to have provided in Braun a substrate holder comprising a metal-ceramic composite for the purpose improving the thermal conductivity of the substrate holder, so as to reduce the size of the print head.

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964) and Hara et al. (4,296,421), as applied to claims 1-5 and 10-12 above, and further in view of Ta et al. (4,755,836).

Braun, as modified, teaches the claimed invention with the exception of carriage positioning devices positioned adjacent the side walls of the substrate holder.

Ta et al. teaches an ink jet cartridge having a plurality of lands (74, 78, 80) for the purpose of aligning the cartridge in the carriage.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in Braun, as modified, carriage positioning devices for the purpose of aligning the cartridge in the carriage as taught by Ta et al.

7. Claims 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964), Hara et al. (4,296,421), Ta et al. (4,755,836) and Keefe et al. (5,278,584).

Braun, as modified, teaches the claimed invention, as disclosed above, with the exception of at least two alignment devices adjacent one of the side walls and attaching a TAB circuit to the semiconductor substrates.

Ta et al. teaches an ink jet cartridge having a plurality of lands (74, 78, 80) for the purpose of aligning the cartridge in the carriage.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in Braun, as modified, carriage positioning devices for the purpose of aligning the cartridge in the carriage as taught by Ta et al. It would have been an obvious matter of design choice to position the alignment devices adjacent to the side walls.

Keefe et al. discloses an ink jet print cartridge comprising a TAB circuit (18) which cover a printer cartridge headland (50) for the purpose of providing electrical connections in a known alternative manner. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in Braun, as modified, a TAB circuit, as taught by Keefe et al., for the purpose of providing electrical connections in a known alternative manner.

Ta et al. teaches an ink jet cartridge having a plurality of lands (74, 78, 80) for the purpose of aligning the cartridge in the carriage. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in Braun, as modified, carriage positioning devices for the purpose of aligning the cartridge in the carriage as taught by Ta et al. It would have been an obvious matter of design choice to position the alignment devices adjacent to the side walls.

Wong discloses an ink jet print head comprising a substrate support panel (50) having a recess (48) for accommodating and cooling a semi-conductor substrate (12). As can be seen in Fig. 8, the support panel has a top surface and side walls which define a cylindrical first opening (100) which is located opposite the top surface. Plastic alignment pins are provided adjacent the side walls for attaching the panel to holes in a plastic ink cartridge (10) which is positioned adjacent to the support panel. It would have been obvious to one of ordinary skill in the art to provide the cylindrical first openings (100) around the perimeters of the side walls and the plastic alignment pins on the support panel, since it has been held that rearranging the parts of an invention involves only routine skill in the art. This would suggest to one of ordinary skill in the art to provide in Braun, as modified, slots along the perimeter of the side walls for the purpose of attaching the fluid block to the ink reservoir. Furthermore, it would have been obvious to one of ordinary skill in the art to make the carrier removable from the ink reservoir to allow replacement of the ink reservoir with necessitating the replacement of the carrier.

The other cited references have been discussed above.

12. Claims 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964), Hara et al. (4,296,421), Ta et al. (4,755,836) and Wong, as applied to claims 25-28 and 31 above, and further in view of Wenzel et al. (5,426,458).

See rejection of claims 6, 7, 19 and 20, above.

13. Claims 32-35, 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964), Hara et al. (4,296,421) and Keefe et al. (5,278,584).

Braun discloses the claimed invention, as above, with the exception of at least one of sides of the substrate carrier having a substantially planar surface extending from the substrate surface essentially perpendicular there to for containing contact pads, and at least two of the four side containing cooling fins.

Hara et al. discloses the claimed invention as above. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provided additional cooling fins on different sides of the substrate carrier, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art (St. Regis Paper Co. v. Bemis Co., 193 USPQ 8).

Keefe et al. discloses an ink jet print cartridge comprising a TAB circuit (18) which cover a printer cartridge headland (50). As can be seen in Fig. 6, the TAB circuit, having electrical contact pads (20), extends along the sides of the cartridge so that it is generally perpendicular to the substrate for the purpose of providing electrical connections in a known alternative manner. It would have been obvious to one of

8. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964), Hara et al. (4,296,421), Ta et al. (4,755,836) and Keefe et al. (5,278,584), as applied to claims 14-18 above, and further in view of Wenzel et al. (5,426,458).

See rejection of claims 6 and 7, above.

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964), Hara et al. (4,296,421), Ta et al. (4,755,836) and Keefe et al. (5,278,584), as applied to claims 14-18 above, and further in view of Drake et al. (5,079,189).

See rejection of claim 8, above.

10. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964), Hara et al. (4,296,421), Ta et al. (4,755,836) and Keefe et al. (5,278,584), as applied to claims 14-18 above, and further in view of Cook (5,834,689).

See rejection of claim 8, above.

11. Claims 25-28 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964), Hara et al. (4,296,421), Ta et al. (4,755,836) and Wong (5,084,713).

Braun teaches the claimed invention, as disclosed above, with the exception of at least two alignment devices and a plurality of slots for attaching the nose piece to the reservoir.

ordinary skill in the art at the time the invention was made to have provided in Braun, as modified, a TAB circuit as disclosed by Keefe et al. for the purpose of providing electrical connections in a known alternative manner.

Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braun (4,942,408) in view of Fukuda et al. (5,066,964), Hara et al. (4,296,421) and Keefe et al. (5,278,584), as applied to claims 32-35, 38 and 39, and further in view of Wenzel et al.

See rejection of claims 6, 7, 19, 20, 29 and 30 above.

***Response to Arguments***

14. Applicant's arguments filed )9/20/00 have been fully considered but they are not persuasive.

Applicants' argument that Wong et al. teaches away from a heat sink element as described in Braun is not persuasive. First, Wong et al. is not applied against all of the claims. Therefore, discussion of this reference should be limited only to those claims against which it is applied. Second, while Wong et al. teaches an improved method of cooling the substrate it does teach that *"one technique [of cooling a substrate] has involved the attachment of a metal heat sink unit (e.g. a manifold) adjacent the resistor assembly in the cartridge."* (col. 1:45-50). Thus, Wong et al. clearly teaches that it is known in the ink jet art to cool the substrate by the use of a heat sink.

Applicants' arguments that Braun and Fukuda et al are not combinable because Braun teaches a roofshooter print head and Fukuda et al. teaches a side shooter print

head are not persuasive. Applicants' claimed invention is directed toward cooling a substrate having heating resistors, not towards the direction of droplet ejection. Applicants' have not provided any arguments as to how the direction of droplet ejection would effect the combination of Braun and Fukuda et al. with respect to the heat sink. Heating resistors are used in both roofshooters and topshooters, therefore, it is desirable to have a means for removing excess heat in both kinds of printheads. Furthermore, it is well known in the ink jet art that roofshooters are equivalent to sideshooters as evidenced by Matsuda et al. (4,596, 994). Therefore, the teaching of a heat sink in a sideshooter would be equally applicable to a roofshooter.

Applicants' argument that Fukuda et al. requires that a liquid path be formed in the heat exchanger and that this is substantially different than simply using a heat sink as described in Braun is not persuasive. First, Braun does not teach the use of a heat sink. The use of a heat sink in Braun is suggested by the teachings of Fukuda et al. The combination of Fukuda et al. and Braun teach a heat sink that is in contact with both the chip carrier and the ink for the purpose of dissipating heat. Therefore, Braun and Fukuda et al. are combinable.

Applicants' argument that Fukuda et al. does not teach modifying Braun to provide fins on the outside of the ink reservoir is not persuasive. First, Applicants' do not claim this feature. Second, Fukuda et al. clearly shows (Fig. 3) that cooling fin is provided which extends from the interior of the cartridge to the exterior for the purpose of releasing heat into the atmosphere. This would suggest to one of ordinary skill in the

art that Braun could be modified with the teachings of Fukuda et al. to provide such a feature.

Applicants' argument that Hara et al. is not properly combinable with Braun and Fukuda et al. because it teaches a sideshooter type head is not persuasive. This argument was addressed above in reference to Braun and Fukuda et al.

Applicants' argument that Hara et al. uses a Peltier cooler and a fan in addition to the heat sink is not persuasive. First, Applicants' claim language uses the term "comprising" which is open ended and does not exclude the inclusion of other elements. Second, although Hara et al. uses additional components for cooling, it still teaches the use of cooling fins for enhancing the efficiency of the heat sink. This teaching is clearly applicable to the teachings of Hara and Fukuda et al.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In the instant case, the Examiner has provided a reference, Braun, which teaches a substrate holder having Applicants' claimed structure. Fukuda et al. provided the suggestion to one of ordinary skill in the art of making the substrate holder of Braun out of a heat sink material for the purpose of conveying heat generated by the heating

resistors. Both Fukuda et al. and Hara et al. teach the use of fins for enhancing the efficiency of a heat sink. This teaching is clearly applicable of Braun and Fukuda et al. Therefore, the Examiner has shown reasons why one of ordinary skill in the art would select the elements from the cited prior art for combination in the manner claimed.

In response to applicant's argument that even if the references where combined, the combination would not provide Applicants' invention, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Applicants' argument that the prior art does not teach the chamber is not persuasive as Braun teaches an ink inlet (55). This element is a chamber.

The Examiner also wishes to point out that Applicants' have not amended the claims to recite that the fins and carrier are of a unitary construction as suggested in the telephone interview.

***Conclusion***

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within